



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/670,917	09/29/2000	Norikazu Mizuno	81877.0007	1895
26021	7590	03/25/2004	EXAMINER	
HOGAN & HARTSON L.L.P. 500 S. GRAND AVENUE SUITE 1900 LOS ANGELES, CA 90071-2611			GUERRERO, MARIA F	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 03/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	09/670,917	MIZUNO ET AL.	
	Examiner	Art Unit	
	Maria Guerrero	2822	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 December 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,6-8 and 22-35 is/are pending in the application.
- 4a) Of the above claim(s) 31-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,6-8 and 22-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

1. This Office Action is in response to the Amendment filed December 8, 2003.

Claim 3-5 and 9-21 are canceled.

Claims 1-2, 6-8, and 22-35 are pending.

### ***Election/Restrictions***

2. Newly submitted claims 31-35 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: claims 31-35 required several new manipulative steps than are considered to be distinct to the invention originally claimed.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 31-35 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

### ***Priority***

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Specification***

4. The abstract of the disclosure is objected to because the abstract should be in the range of 50 to 150 words. Correction is required. See MPEP § 608.01(b).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-2, 6-8, and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carlson et al. (U.S. 5,421,957) (cited by Applicant) in view of Laxman et al. (U.S. 5,874,368).

Carlson et al. teaches forming a silicon nitride film on a reaction container, removing silicon nitride film by introducing  $\text{NF}_3$  gas (Abstract, col. 3, lines 10-15, Table I). Carlson et al. teaches the silicon nitride film is deposited by thermal CVD (col. 4, lines 5-25, 52-55). Carlson et al. discloses after a sufficient number of deposition process a film of sufficient thickness in the range of 1 to 5 micrometers builds up and can contaminate the process (col. 4, lines 43-51). Carlson et al. teaches removing the silicon nitride at a pressure of 12 torr or more (col. 6, lines 3-65). Carlson et al. shows the reaction container being made of quartz (col. 4, lines 1-5).

Carlson et al. fails to show forming the silicon nitride film with bis tertiary butyl amino silane and  $\text{NH}_3$ . However, Laxman et al. shows forming a silicon nitride layer with bis tertiary butyl amino silane and  $\text{NH}_3$  by chemical vapor deposition (col. 4, lines 5-20, col. 5, lines 35-50).

The determination of the appropriated accumulated thickness on the reaction container is considered to be obvious to a person of ordinary skill in the art because it is

Art Unit: 2822

not critical to the invention." In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir.1990). See also MPEP § 716.02- § 716.02(g).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Carlson et al. reference by including the formation of nitride films using bis tertiary butyl amino silane as taught Laxman et al. The modification would produce a silicon nitride film having superior uniformities and would eliminate buildup of the silicon nitride layer on internal chamber parts producing less global warming gas effluents.

6. Claims 26-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carlson et al. (U.S. 5,421,957) (cited by Applicant) in view of Laxman et al. (U.S. 5,874,368) and Nagashima et al. (U.S. 5,129,958).

Carlson et al. teaches forming a silicon nitride film on a reaction container, removing silicon nitride film by introducing  $\text{NF}_3$  gas (Abstract, col. 3, lines 10-15, Table I). Carlson et al. teaches the silicon nitride film is deposited by thermal CVD (col. 4, lines 5-25, 52-55). Carlson et al. discloses after a sufficient number of deposition process a film of sufficient thickness in the range of 1 to 5 micrometers builds up and can contaminate the process (col. 4, lines 43-51). Carlson et al. teaches removing the silicon nitride at a pressure of 12 torr or more (col. 6, lines 3-65). Carlson et al. shows the reaction container being made of quartz (col. 4, lines 1-5).

Carlson et al. fails to show forming the silicon nitride film with bis tertiary butyl amino silane and  $\text{NH}_3$ . However, Laxman et al. shows forming a silicon nitride layer with

Art Unit: 2822

bis tertiary butyl amino silane and  $\text{NH}_3$  by chemical vapor deposition (col. 4, lines 5-20, col. 5, lines 35-50).

Carlson et al. fails to show purging the reaction container using  $\text{NH}_3$  gas at least one of before and after of forming the silicon nitride film. However, Nagashima et al. shows the step of purging the reaction container using  $\text{NH}_3$  gas (Abstract, col. 2, lines 20-60, col. 3, lines 1-20).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Carlson et al. reference by including the teaching of Laxman et al. and Nagashima et al. The modification would produce a silicon nitride film having superior uniformities and would eliminate the deleterious effects of fluorine after the cleaning process during previous to deposition (Nagashima et al., col. 1, lines 50-55, col. 2, lines 3-10).

### ***Response to Arguments***

7. Applicant's arguments filed December 8, 2003 have been fully considered but they are not persuasive. Claims 1-2, 6-8, and 22-30 stand rejected.

Applicant argued that Carlson et al. is silent about films lower than 10,000 angstroms. However, Carlson et al. shows several tests below 4000 angstroms (see Table I).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208

Art Unit: 2822

USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Furthermore, "where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

In addition, the rejection is maintained because applicant has failed to show that the thickness claimed is critical to the invention, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir.1990). See MPEP § 716.02 - § 716.02(g).

### ***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 2822

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Maria Guerrero  
Primary Examiner  
March 19, 2004